

**MATH-57091 Probability and Statistics for High-School Teachers.**  
**Home Work 12, due on Wednesday November 26**  
**Instructor: Prof. Artem Zvavitch**

**Problem 1.** *The number of lunches served at a school cafeteria last year was normally distributed with mean 300. The menu has been changed this year to healthier foods, and the administration wants to test the hypothesis that the mean number of lunches sold is unchanged. A sample of 12 days yielded the following number of lunches sold:*

312, 284, 281, 295, 306, 273, 264, 258, 301, 277, 280, 275

*Is the hypothesis that the mean is equal to 300 rejected at the*

- 10 percent
- 5 percent
- 1 percent level of significance?

**Problem 2.** *Use the results of last Sunday's major league baseball scores to test the hypothesis that the average number of runs scored by winning teams is 5.6. Use the 5 percent level of significance.*

**Problem 3.** *A water official insists that the average daily household water use in a certain country is at least 400 gallons. To check this claim, a random sample of 25 was checked, The average of those sampled was 367 with a sample standard deviation of 62. Is this consistent with the official's claim?*

**Problem 4.** *In 2001, entering students at a certain university had an average score of 542 on the verbal part of SAT. A random sample of the scores of 20 students in the 2003 class resulted in the following scores*

542, 490, 582, 511, 515, 564, 500, 602, 488, 512, 518, 522, 505, 569, 575, 515, 520, 528, 533, 515

*Do the given data prove that the average score has decreased to below 542? Use 5 percent level of significance.*